

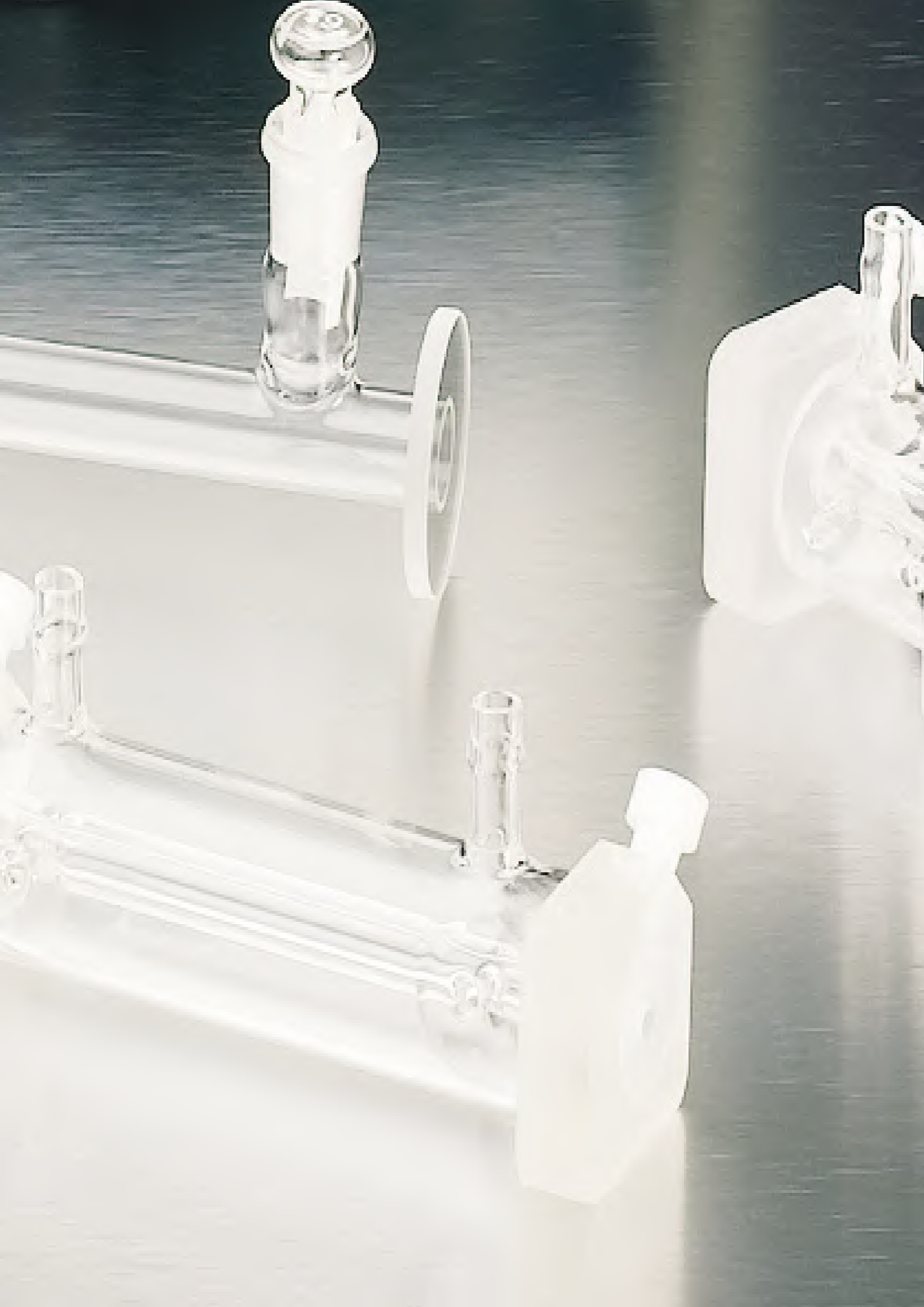
# Digital Polarimeter

P-2000 Series



**Jasco**

Performance  
Innovation  
Reliability



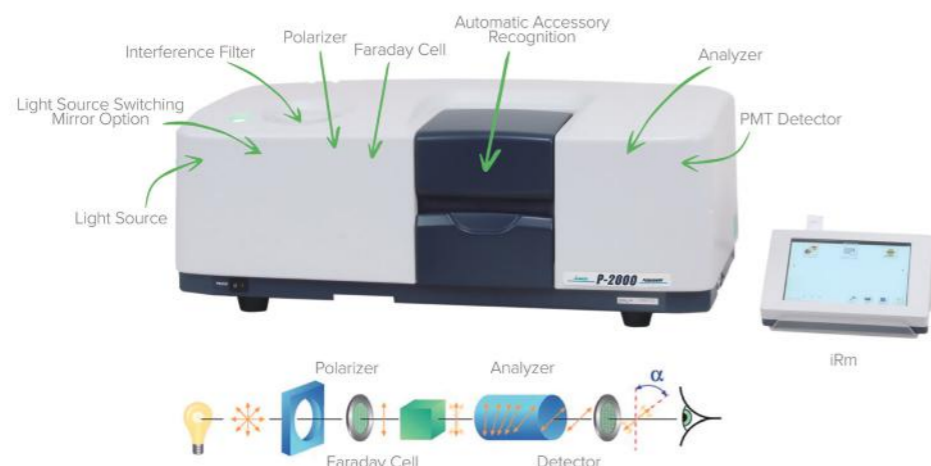
The P-2000 is a configurable, high precision digital polarimeter with a variety of sampling and measurement accessories for greater flexibility as applications grow and change. Optional wavelength filters and source lamps cover a wide range of analytical wavelengths from the UV-Visible to NIR in addition to the traditional sodium (589 nm) lamp used for regulatory compliance.

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# System Features



## Advanced Control

Two options for operation are available including Spectra Manager™ Suite innovative cross-platform spectroscopy software for Windows. And the intelligent remote module (iRM) with color LCD touch screen. These two control and analysis interfaces allow full instrument control and data processing. Regulatory compliance for 21 CFR part 11 is available as an option with PC based Spectra Manager CFR™.

## High Speed, Precision and Accuracy

For fast measurement, the P-2000 has a response speed of up to 6° per second, with a resolution of 0.0001°. The wide dynamic range up to ±90° enables measurement over a very broad range of concentrations. The sample chamber includes temperature measurement with the actual temperature constantly updated and displayed on the control screen.

## Accessories

An assortment of accessories and cells are available for a diverse range of sampling types such as cylindrical glass and demountable stainless steel cells, Peltier thermostatted cell holders, and sample sippers. Quick-connect fittings with flow control valves are used for simple exchange of water jacketed cells.

# Models

**P-2000 WI** includes a tungsten halogen lamp and 589 nm interference filter for routine pharmaceutical measurements with the flexibility to add additional filters\* as applications and needs grow.

\*Available interference filters: 325, 334, 365, 405, 436, 546, 578, 589, 633, 880 nm

**P-2000 Na+** For users requiring purity and identification measurements of pharmaceuticals using the 589nm D-line of the sodium lamp. The sodium lamp produces the most accurate and legally defensible Na-D line.

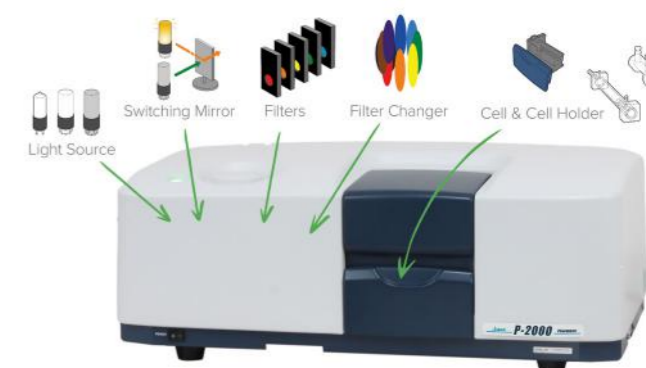
**P-2000 Na/Hg** uses both sodium and mercury lamp with 6 interference filters\* spanning the UV to visible region for the most analytically demanding laboratories.

\*Available interference filters: 253, 280, 296, 302, 313, 334, 365, 405, 436, 546, 578, 589 nm

All P-2000 digital polarimeters are iRM and PC compatible (21 CFR Part 11 optional for PC).

# Ultimate Flexibility

The P-2000 Digital Polarimeter is a highly configurable instrument, with optional selection of the light source(s), cells, cell holders and wavelengths ranging from the UV-Visible to NIR. The system can be configured to the specific requirements of virtually any application. The user can choose the simplest system matched to their application.



## Light Sources

- Up to two light sources can be installed inside the instrument with automatic light source exchange and recognition
- The light source can be easily updated in the field

## Wavelength Selection

- A comprehensive range of narrow band interference filters covers the entire spectral range with automatic recognition (and an optional filter wheel for completely automated exchange)
- The optional wavelength extension kit extends the operating range to include the UV-Visible (253 nm) to NIR (880 nm)

| Light Source | Wavelength (nm) |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|--------------|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|              | 253             | 280 | 296 | 302 | 313 | 325 | 334 | 365 | 405 | 436 | 546 | 578 | 589 | 633 | 880 |
| Na           |                 |     |     |     |     |     |     |     |     |     |     |     | •   |     |     |
| Hg           | •               | •   | •   | •   | •   |     | •   | •   | •   | •   | •   | •   |     |     |     |
| WI           |                 |     |     |     |     | •   | •   | •   | •   | •   | •   | •   | •   | •   | •   |

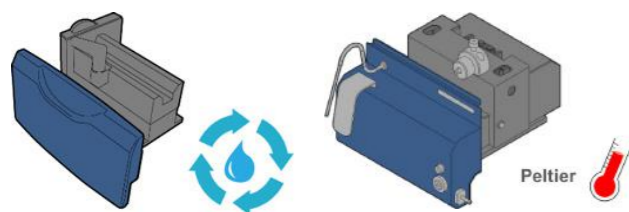
# Validation

## Simplicity, Reliability and Complete Validation Protocols

The automated validation program is compliant with the requirements of GLP/cGMP, USP and FDA. Validation is used for automated periodic testing of light source energy, zero repeatability, and rotational accuracy/repeatability. For guaranteed measurement accuracy, filters and sample cells with certified optical path length can be used and NIST-traceable calibration standards are also available.

- Polarimeters with both the iRM and Spectra Manager™ include a standard validation program for GLP/cGMP laboratories or those regulated by the FDA
- The validation program can be used to keep track of periodic checking of light source energy, zero repeatability, and rotational accuracy/repeatability to ensure measurements remain in compliance
- Certified filters, sample cells with a certified optical path length, and NIST-traceable quartz rotation plates are available for laboratories that demand the highest quality results

# Accessories



## Cell Holders

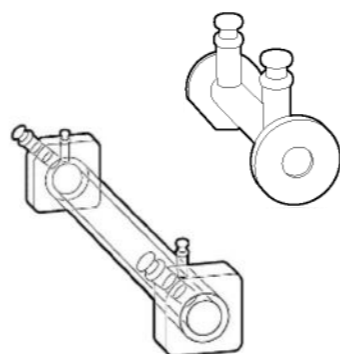
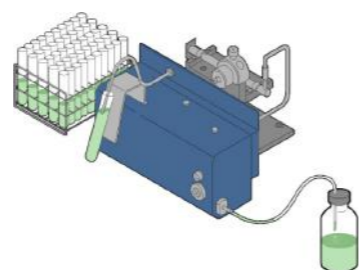
Quick-connect fittings with stop valves in the sample compartment provide simple and secure exchange of water-thermostatted cells for temperature control with water circulators. A Peltier cell holder offers accurate temperature control with  $\pm 0.1^\circ$  accuracy.

| Part Number | Description                        | Dimensions (mm) | Volume (mL) |
|-------------|------------------------------------|-----------------|-------------|
| 1103-1101A  | CG1-100 Cylindrical Glass Cell     | 10 x 100        | 8.7         |
| 1103-1136A  | CG1-50 Cylindrical Glass Cell      | 10 x 50         | 4.35        |
| 1103-1134A  | CG1-10 Cylindrical Glass Cell      | 10 x 10         | 0.89        |
| 1103-1105A  | CG3-100 Cylindrical Glass Cell     | 3.5 x 100       | 0.98        |
| 1103-1106A  | CG3-50 Cylindrical Glass Cell      | 3.5 x 50        | 0.49        |
| 1103-1133A  | CG3-10 Cylindrical Glass Cell      | 3.5 x 10        | 0.098       |
| 1103-1170A  | CG2-10 Cylindrical Glass Cell      | 2.5 x 10        | 0.039       |
| 1103-1167A  | CG2-100 Cylindrical Glass Cell     | 2.5 x 100       | 0.393       |
| 1103-1109A  | WCG1-100 Water Jacketed Glass Cell | 10 x 100        | 8.7         |
| 1103-1110A  | WCG1-50 Water Jacketed Glass Cell  | 10 x 50         | 4.35        |
| 1103-1112A  | WCG1-10 Water Jacketed Glass Cell  | 10 x 10         | 0.89        |
| 1103-1113A  | WCG3-100 Water Jacketed Glass Cell | 3.5 x 100       | 0.98        |
| 1103-1114A  | WCG3-50 Water Jacketed Glass Cell  | 3.5 x 50        | 0.49        |
| 1103-1116A  | WCG3-10 Water Jacketed Glass Cell  | 3.5 x 10        | 0.098       |
| 1103-2002A  | Flow Through Glass Cell            | 10 x 100        | 8.7         |
| 1103-1021A  | CQ1-100 Cylindrical Quartz* Cell   | 10 x 100        | 8.7         |
| 1103-1022A  | CQ1-50 Cylindrical Quartz* Cell    | 10 x 50         | 4.35        |

\* For use at wavelengths below 350 nm

## Sippers

Provides quick and easy measurements of multiple samples. Built-in ultra micro-pump allows automated sampling and high throughput measurements.



# Specifications

| Digital Polarimeter           |  |
|-------------------------------|--|
| Principle                     | Automatic digital polarimeter with symmetric angular oscillation using the optical-null balance method     |
| Light Source                  | Tungsten-Halogen lamp (W), Sodium lamp (Na), Mercury lamp (Hg) (Up to two light sources can be installed.) |
| Modulator                     | Solid-state Faraday cell   |
| Wavelength                    | 253, 280, 296, 313, 302, 325, 334, 365, 405, 436, 546, 578, 589, 633, 880 nm                               |
| Aperture                      | 1.8, 3 and 8 mm diameter   |
| Angular Range                 | $\pm 90^\circ$   |
| Response Speed                | 6°/sec   |
| Measurement Accuracy          | $\pm 0.002^\circ$ (up to $1^\circ$ ), $\pm 0.2\%$ (larger than $1^\circ$ )                                 |
| Repeatability                 | $\pm 0.002^\circ$  |
| Resolution                    | 0.0001°  |
| Integration Time              | 1 - 100 sec  |
| Detector                      | Photomultiplier tube (1P28-01) (R928 - option)   |
| Readout Modes                 | Optical rotation, optical specific rotation, concentration, sugar scale Z, Brix purity, optical purity     |
| Temperature Measurement Range | 0°-40°C (minimum display temperature: 0.1°C)   |
| Dimensions                    | 653 (W) x 249 (D) x 364 (H) mm   |
| Weight                        | Approx. 30 kg  |
| Power Requirement             | AC100~240V $\pm 10\%$ , 50 or 60 Hz, 80 - 300 W  |

| Cell Holders        |                                      |                             |
|---------------------|--------------------------------------|-----------------------------|
|                     | RSC-200 Room Temperature Cell Holder | PTC-262 Peltier Cell Holder |
| Temperature Control | None (Water Circulation Optional)    | Peltier (Air Cooled)        |
| Range               | -                                    | 15-40°C                     |
| Accuracy            | -                                    | $\pm 0.1^\circ\text{C}$     |
| Cell Diameter       | 10 mm, 3.5 mm, 2.5 mm                |                             |
| Cell Pathlength     | 100 mm, 50 mm, 10 mm                 |                             |

| Sippers               |                                 |  |
|-----------------------|---------------------------------|--|
|                       | SHP-201 Room Temperature Sipper | SHP-201P Peltier Sipper Temperature Control by Peltier |
| Temperature Control   | None                            | Peltier (Air Cooled)                                   |
| Flow Cell             | 100 mm pathlength               |  |
| Minimum Sample Volume | 5 mL                            |  |
| Temperature Range     | -                               | 15 ~ 40°C  |
| Temperature Accuracy  | -                               | $\pm 0.2^\circ\text{C}$                                |



**JASCO INTERNATIONAL CO., LTD.**

11-10, Myojin-cho 1-chome, Hachioji, Tokyo 192-0046, Japan

Tel: +81-42-649-3247 Fax: +81-42-649-3518 <http://www.jascoint.co.jp/english/>

Australia, China, Hong Kong, India, Indonesia, Japan, Korea, Malaysia, New Zealand, Pakistan, Philippines, Russia, Singapore, Taiwan, Thailand

**JASCO, INCORPORATED**

28600 Mary's Court, Easton, Maryland 21601, U.S.A.

Tel: +1-410-822-1220 Fax: +1-410-822-7526 Web: [www.jascoinc.com](http://www.jascoinc.com)

Argentina, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Guatemala, Mexico, Paraguay, Peru, Puerto Rico, United States of America, Uruguay, Venezuela

**JASCO EUROPE S.R.L.**

Via Luigi Cadorna 1, 23894 Cremella (LC), Italy

Tel: +39-039-9215811 Fax: +39-039-9215835 Web: [www.jascoeurope.com](http://www.jascoeurope.com)

**JASCO Deutschland** [www.jasco.de](http://www.jasco.de) | **JASCO UK** [www.jasco.co.uk](http://www.jasco.co.uk) | **JASCO France** [www.jasco.fr](http://www.jasco.fr)

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